

LA-UR-11-10753

Approved for public release; distribution is unlimited.

Title: LANL's Stormwater Management and Protection of the Rio Grande

Author(s): Katzman, Danny

Intended for: Sierra Club



Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the Los Alamos National Security, LLC for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By acceptance of this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

LANL's Stormwater Management Projects and Protection of the Rio Grande

Presentation to the Sierra Club

Pajarito Group

Danny Katzman

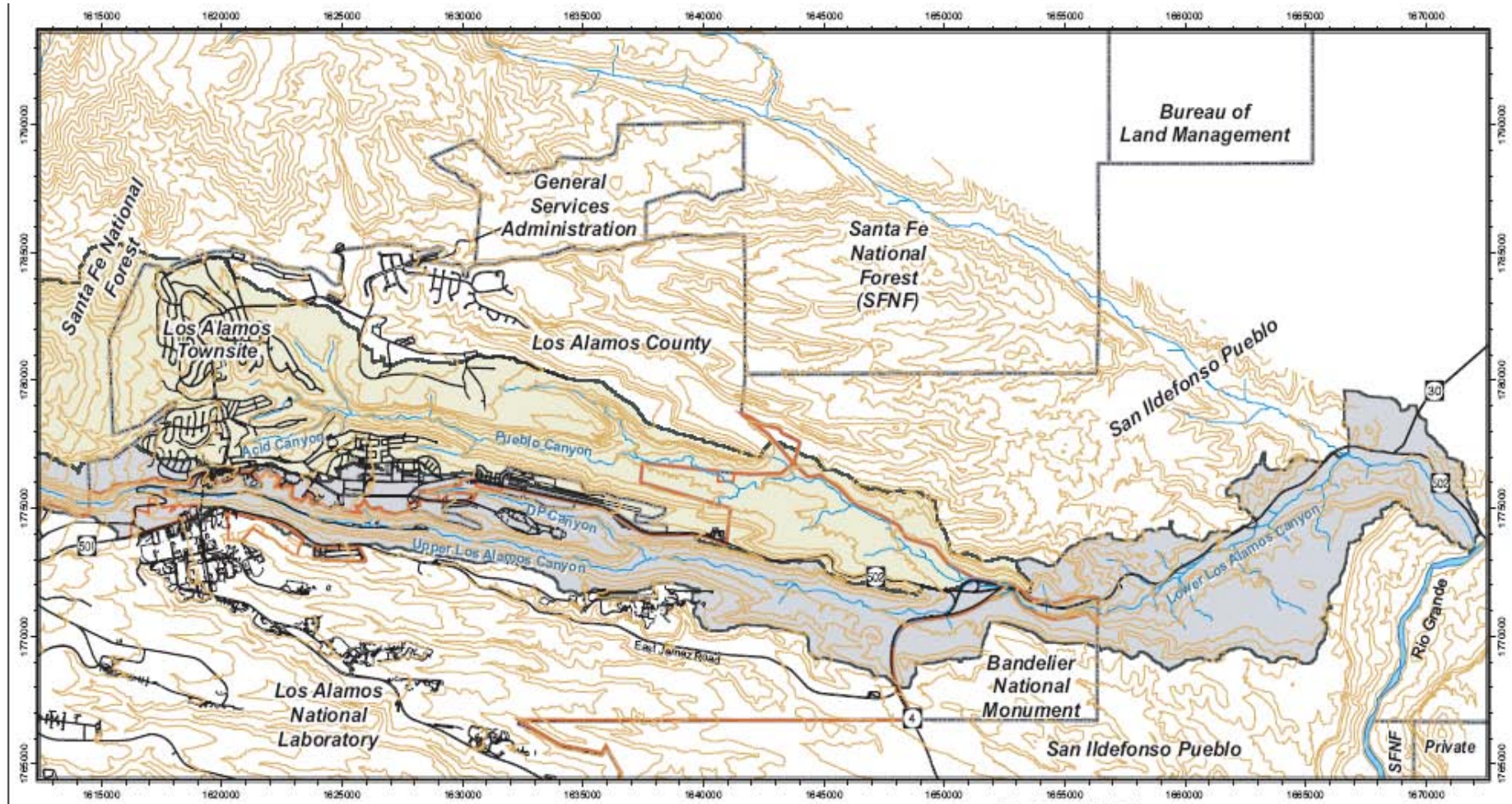
Los Alamos National Laboratory
Environmental Programs Directorate

June 1, 2011

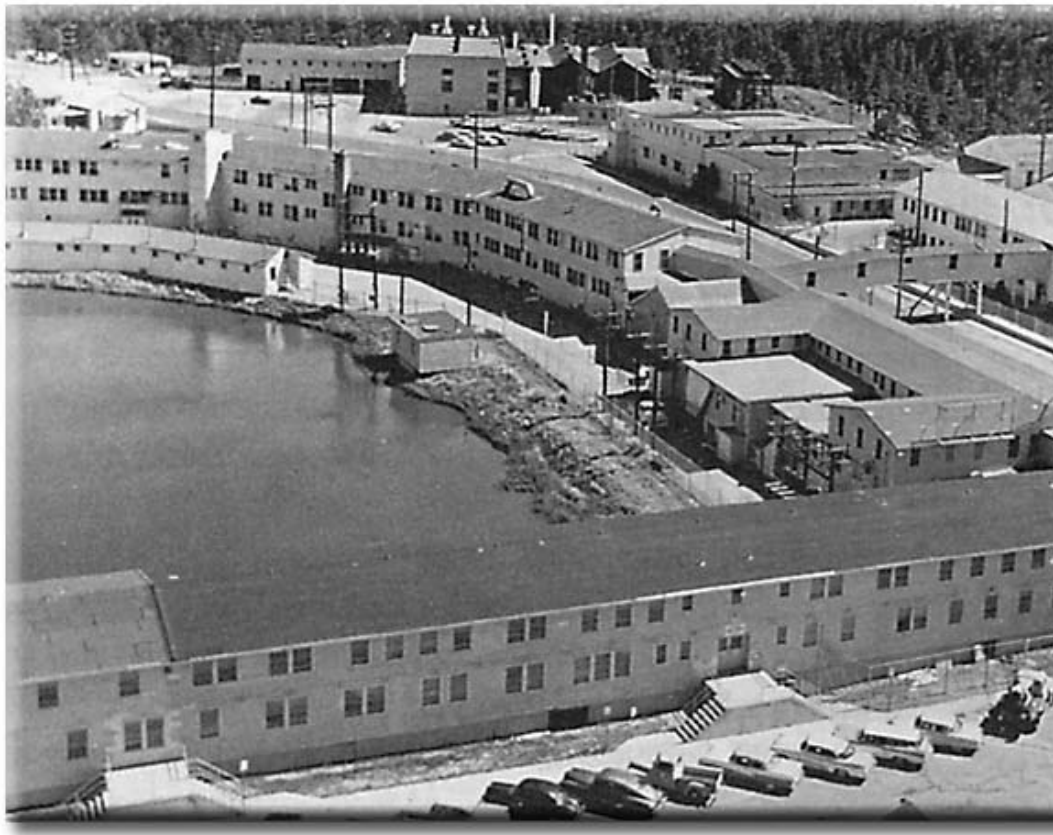
Presentation Goals

- History and status of the Los Alamos and Pueblo Canyon watershed
- Human-health risk and water-quality studies
- Mitigation actions
- Monitoring
- Next Steps

LA/Pueblo Watershed

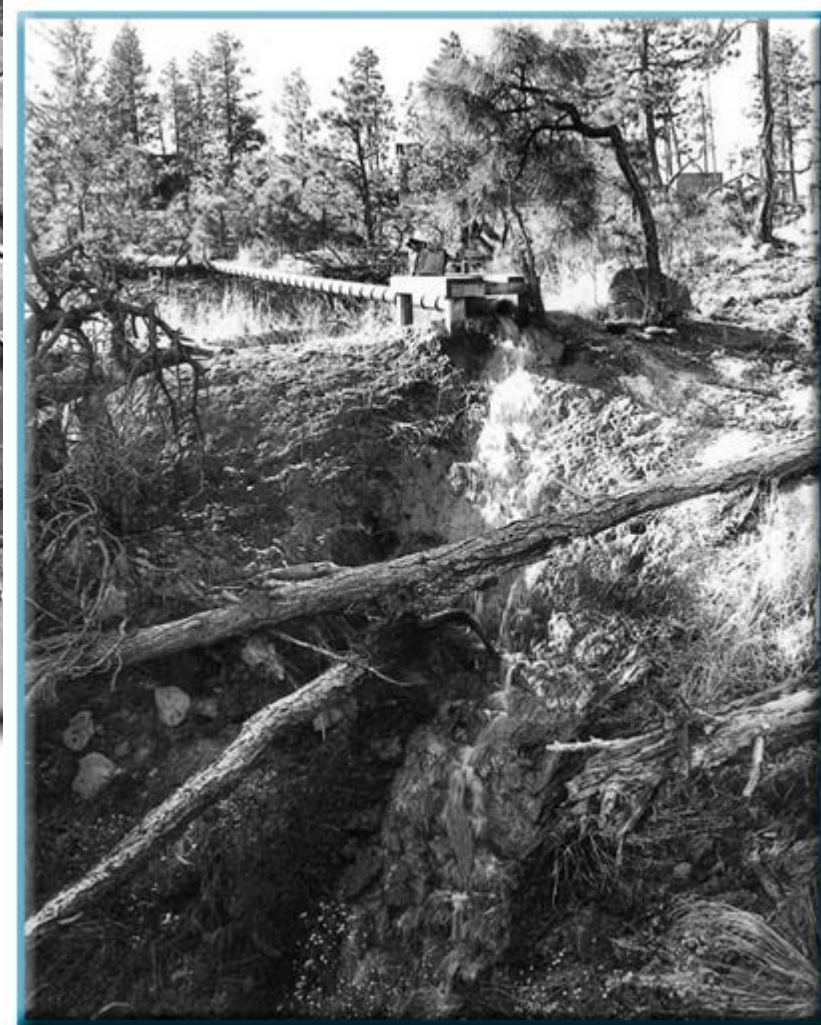


Historical Sources of Contamination



1940s LANL at Ashley Pond

Acid Canyon



Dynamic Canyon Streams - Geomorphology

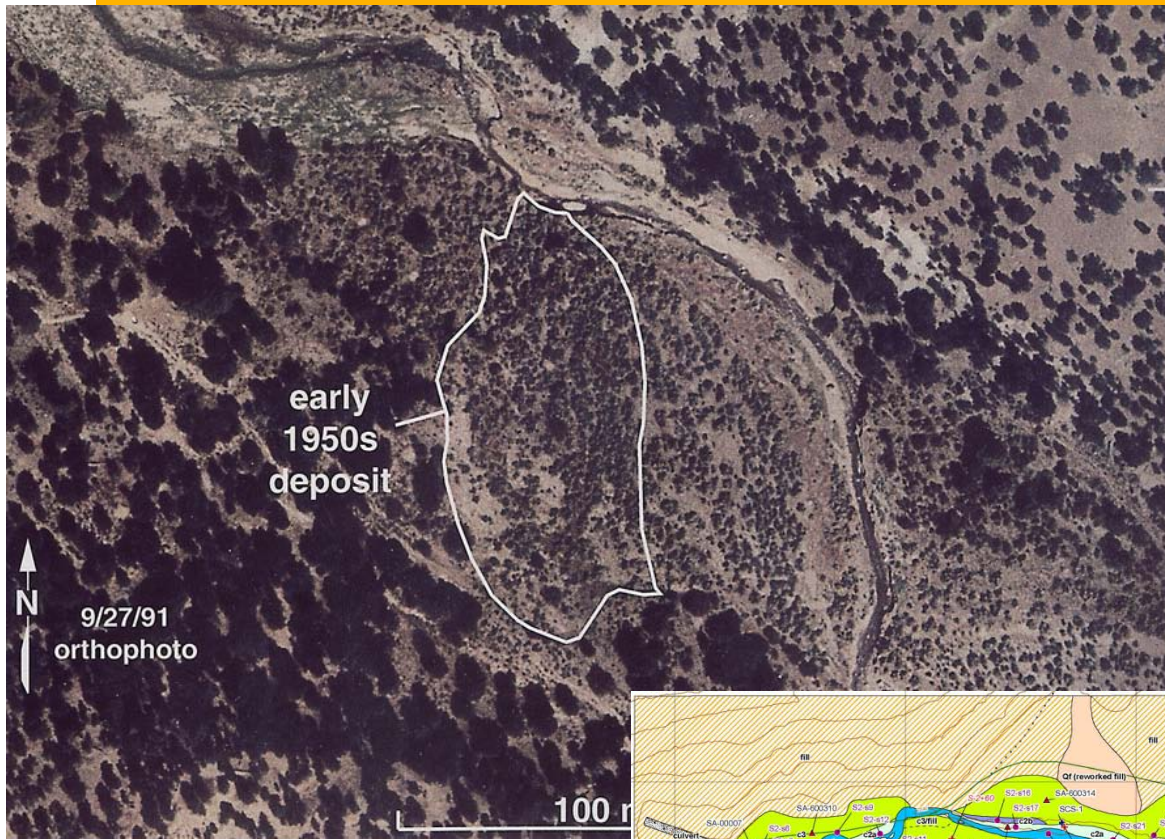
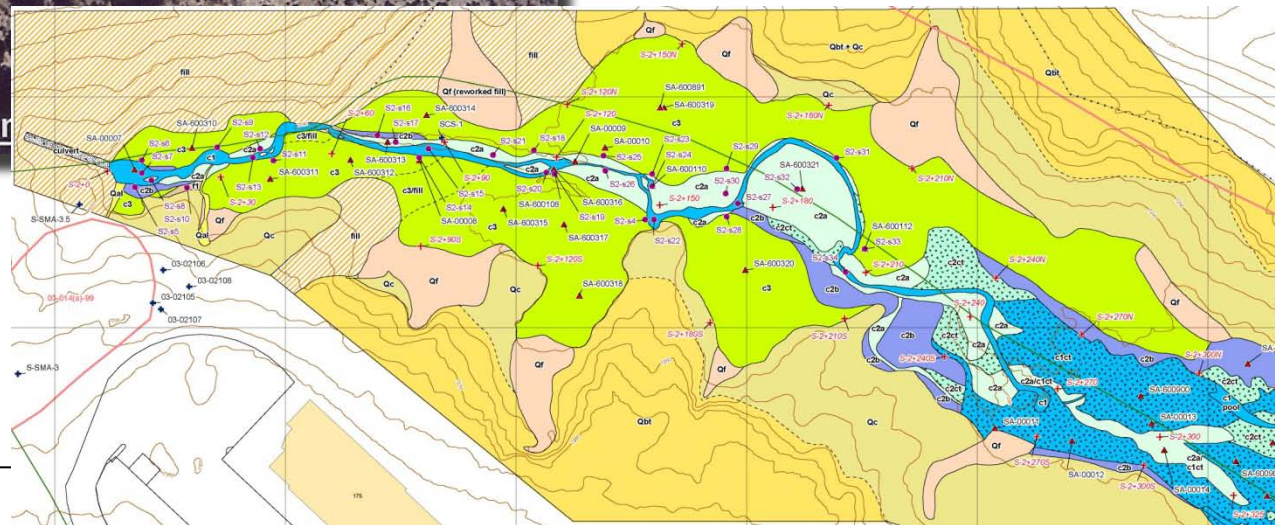


Photo Analysis

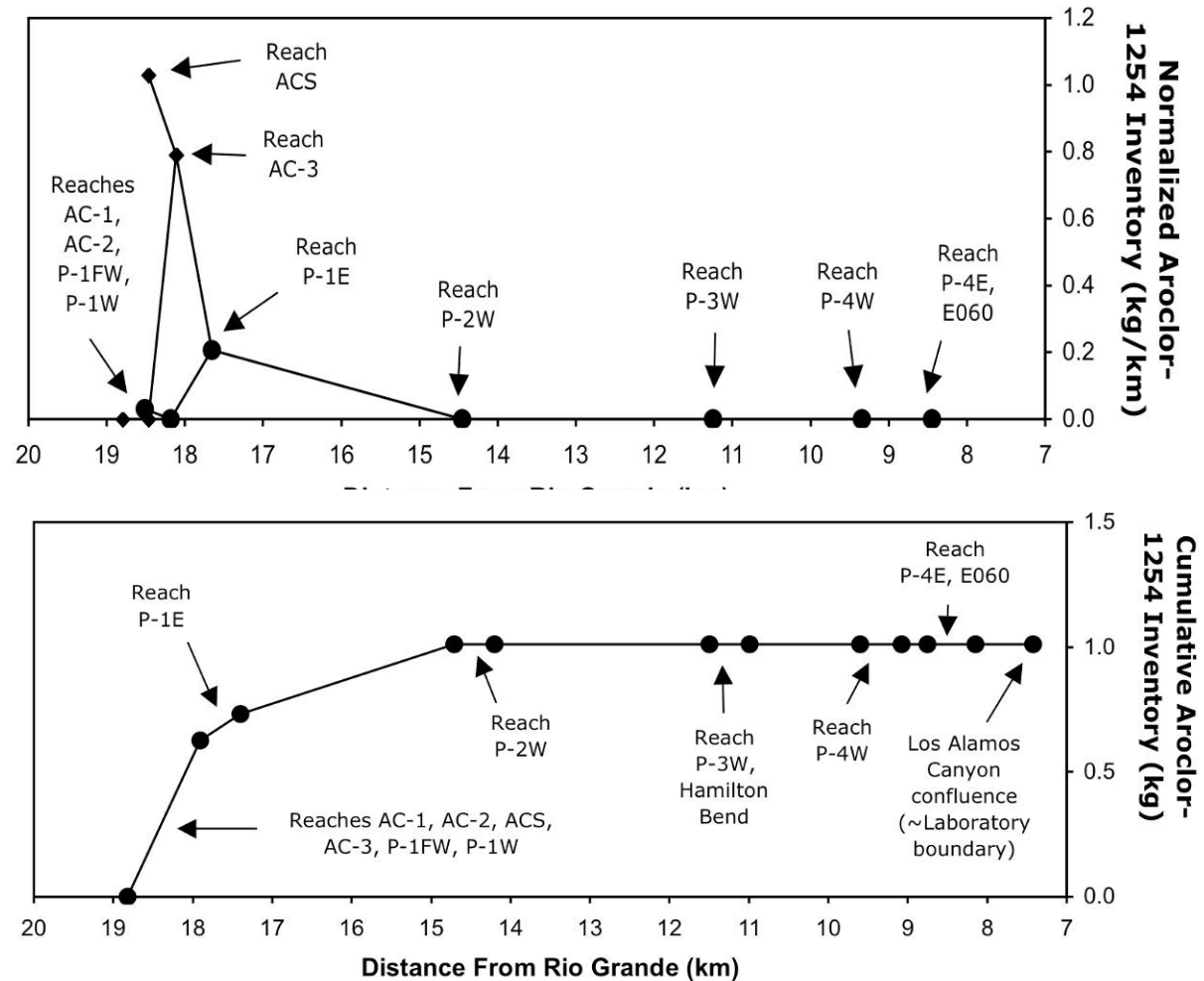
Geomorphic-based characterization

Conclusion: residual contamination is within target risk levels



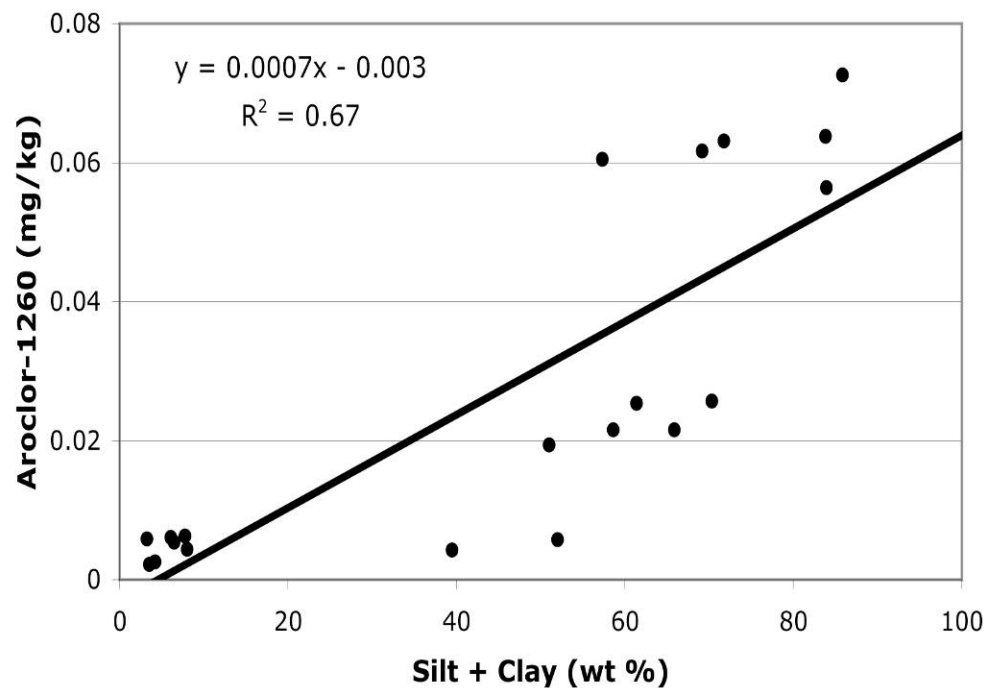
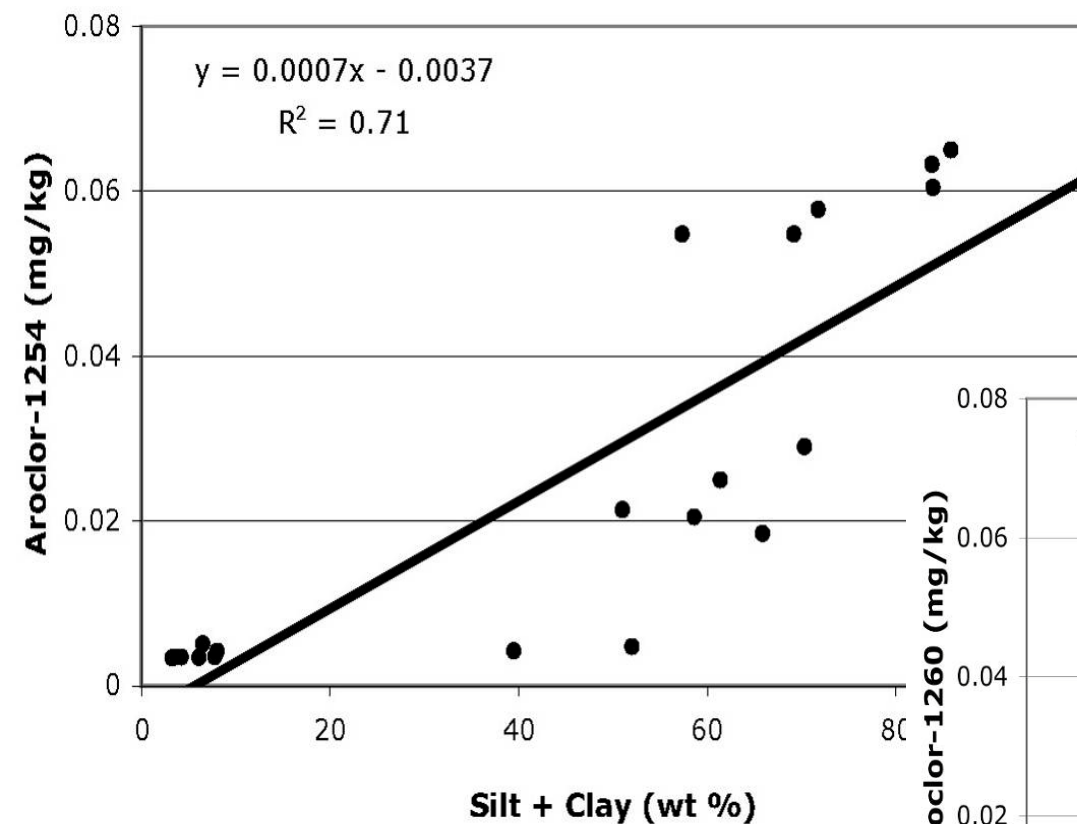
Conceptual Model

Inventory is near original source



Conceptual Model (cont.)

Contaminant concentration related to fine-grained particles



LA/Pueblo Watershed History – Cerro Grande fire

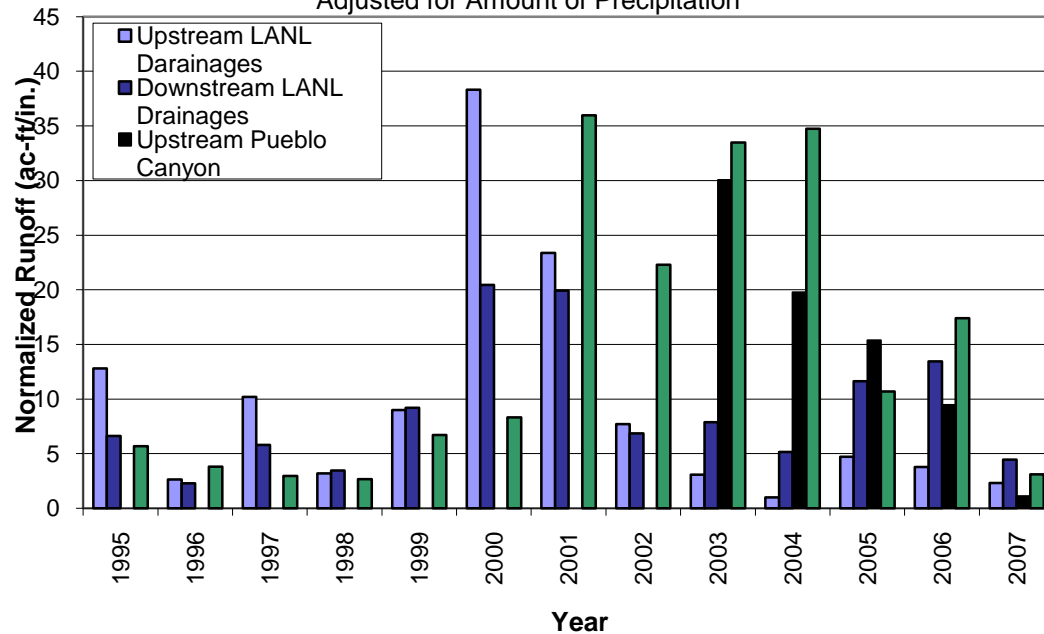


- ❖ Minor rainfall runoff prior to Cerro Grande fire
- ❖ Post-CG fire conditions created perturbation watershed hydrology = greater runoff



Post-Fire Runoff

Summer Runoff Yields (June - Oct)
Adjusted for Amount of Precipitation



Wetland
erosion

Is there risk from Rio Grande water quality?

- Multiple post-Cerro Grande risk assessments
 - Risk Assessment Corporation (independent study, contracted to New Mexico Environment Department) concluded:
 - “Cancer risks for LANL-derived radionuclides and chemicals were within the range of acceptable risks defined by the U.S. EPA”
 - “Estimated intakes of noncarcinogenic LANL-derived chemicals were less than the U.S. EPA’s acceptable intakes”
- Consultant to Buckman Project
 - ❖ Kerry Howe (2008) concluded about contaminants in the Rio Grande:
 - “concentrations in the river [raw water] are nearly always below regulated levels” and
 - “evidence of increased cancer risk from drinking treated Rio Grande water does not exist”
 - ❖ ChemRisk (2010) concluded:
 - “**QUOTE**”

Protective Mitigations

Goal is to maintain or improve conditions

- Targeted contaminant removal
 - Acid Canyon - Plutonium
 - Los Alamos Canyon - PCBs
- Sediment Management using watershed-scale approach
 - √ Reduce flood energy
 - √ Enhance natural geomorphic attributes in watershed to trap suspended sediment
 - stream-bank stabilization
 - reduce flood energy
 - improve wetland stability

Targeted Contaminant Removal – Acid Canyon



Targeted Contaminant Removal – Acid Canyon

Reduced watershed
inventory of Pu by
14%

Reduced exposure-
scenario dose by
50%



Targeted Contaminant Removal



LA-SMA-2
Vacuum upper drainage sediments
Removal of >1,000 cu/yds



Targeted Contaminant Removal



Targeted Contaminant Removal



**LA-SMA -2 Detention Berms
Over 2,000 cu/yd removed**



Sediment Transport Mitigations

Sediment Management using watershed-scale approach

- √ Reduce flood energy
- √ Enhance natural geomorphic attributes in watershed to trap suspended sediment
 - stream-bank stabilization
 - reduce flood energy
 - improve wetland stability

Principle Actions Taken to Achieve Goals

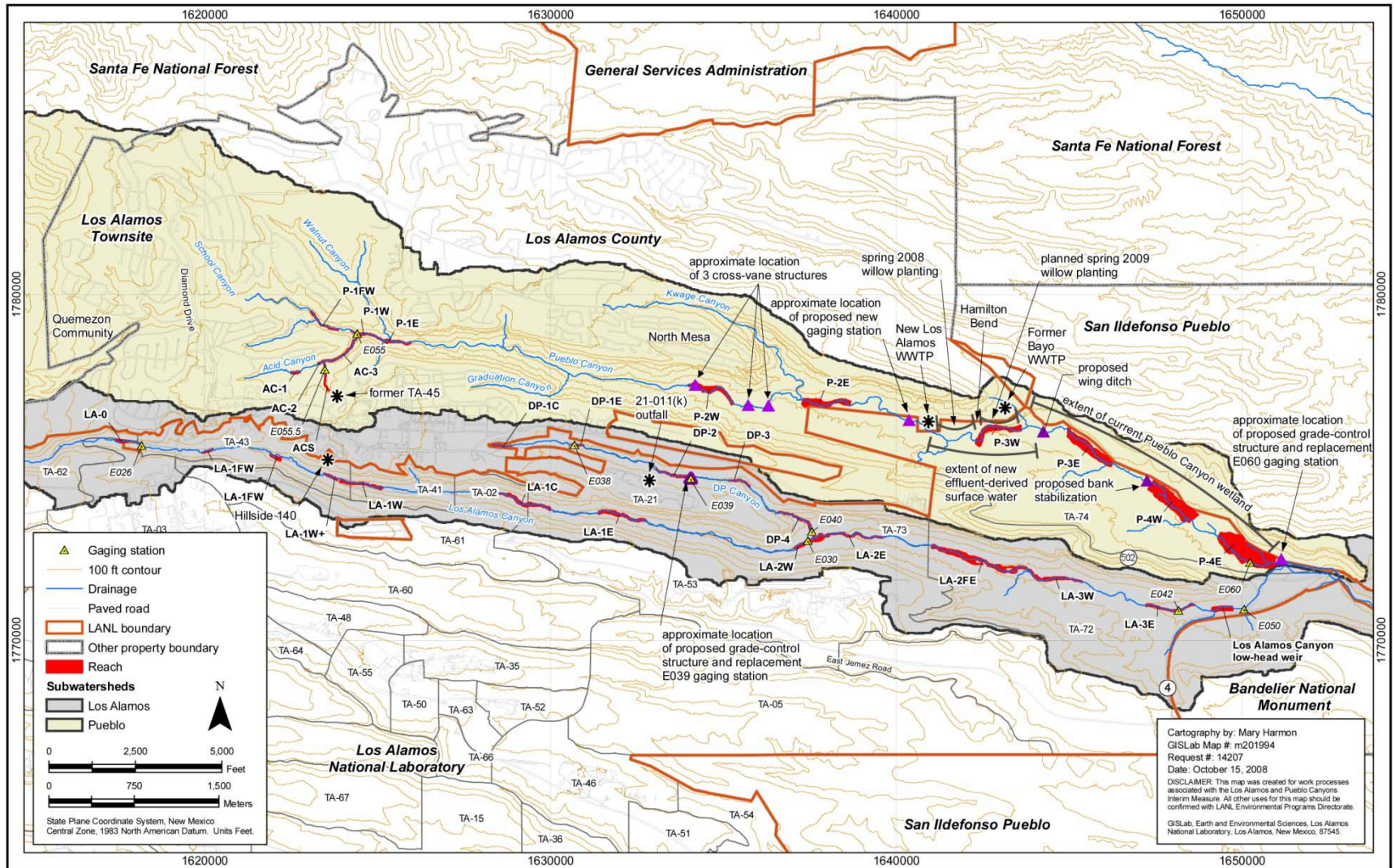
Pueblo Canyon

- Willow planting
- Grade control structure

DP/Los Alamos Canyon

- Grade control structure
- Excavation/Enhancement of LA Weir

Los Alamos/Pueblo Watershed - Mitigations



Performance Monitoring

- 13 gages, collecting up to 4 samples/each annually
- Metals, radionuclides, PCBs and sediment
- Surveys for documenting geomorphic change
- Annual reports to New Mexico Environment Department

Bank Stabilization - Willows



Mitigations Bank Stabilization – Willows (Spring 2009)

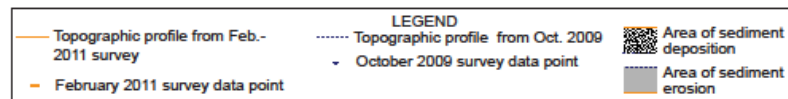
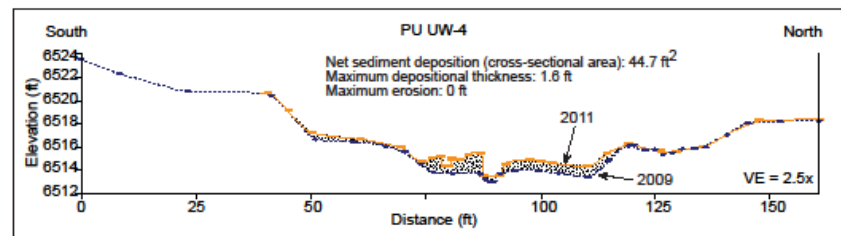
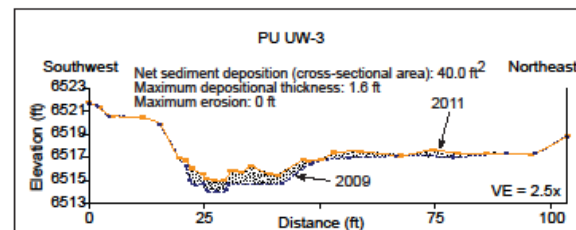
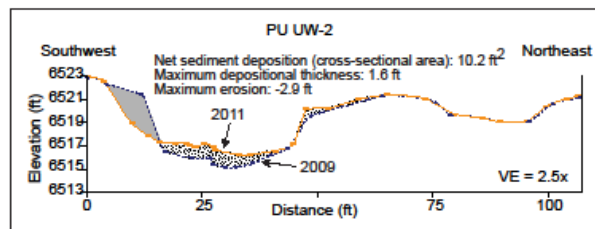
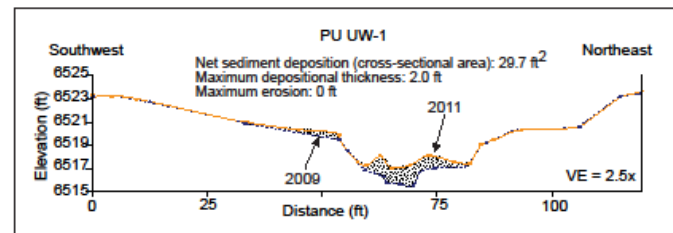
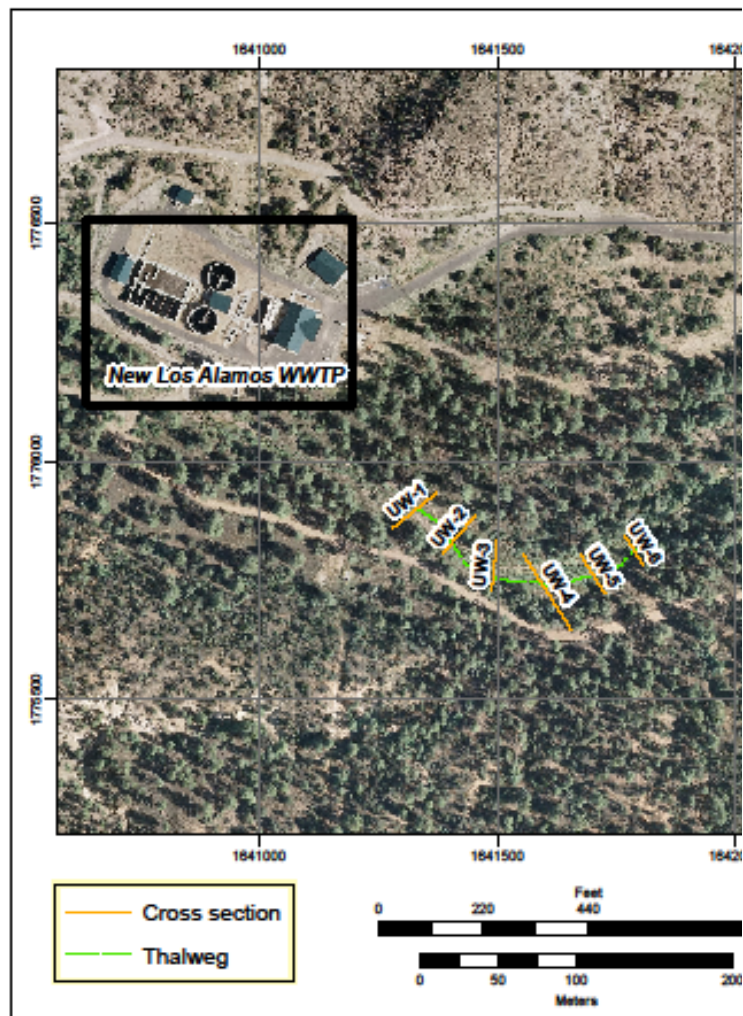
Approximately
6000 willow
poles planted
in Pueblo
Canyon during
Spring 2009



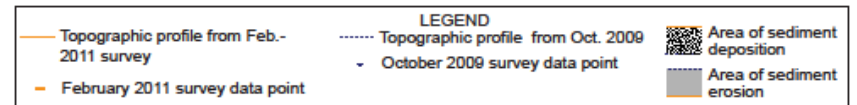
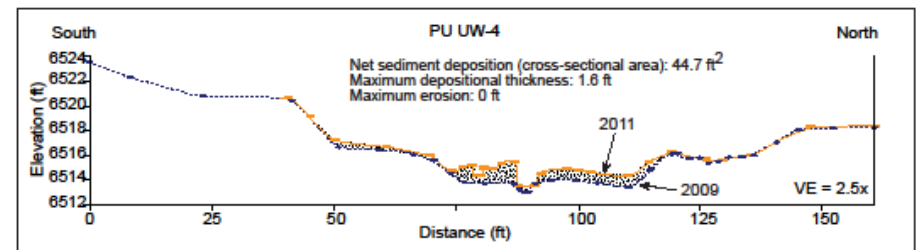
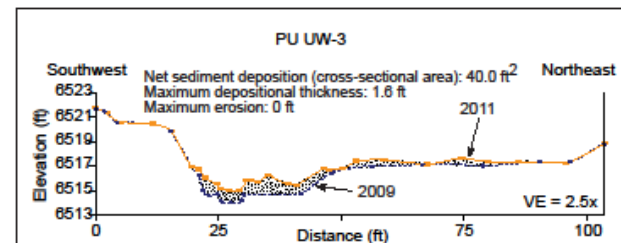
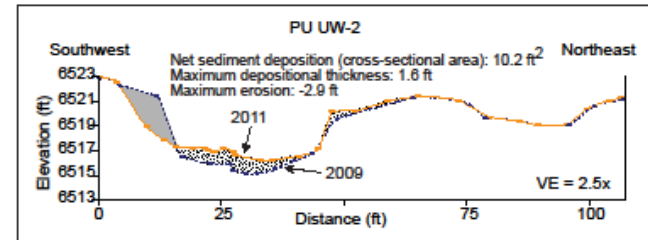
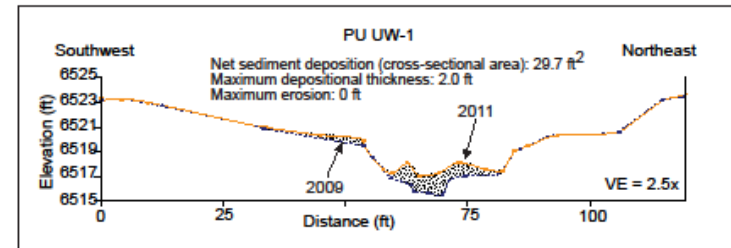
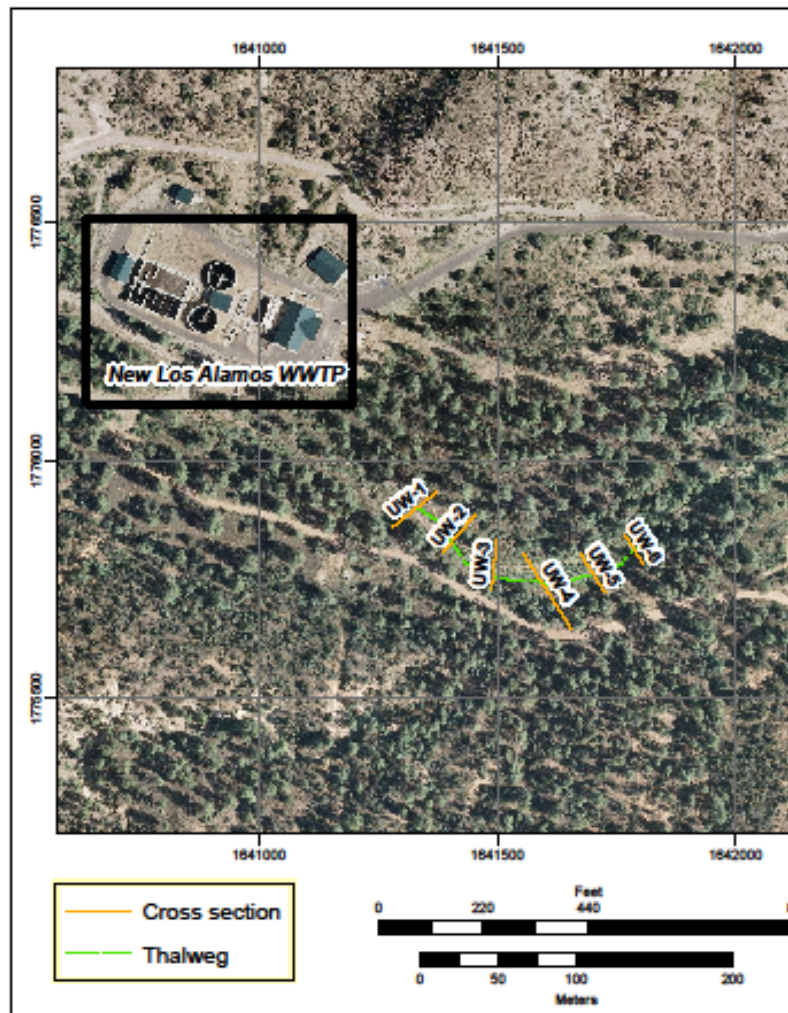
Bank Stabilization – Willows (Summer 2010)

Maintains bank stability,
reduces flood peaks,
traps sediment





Willow Area Surveys



Wetland Function



Healthy Wetland

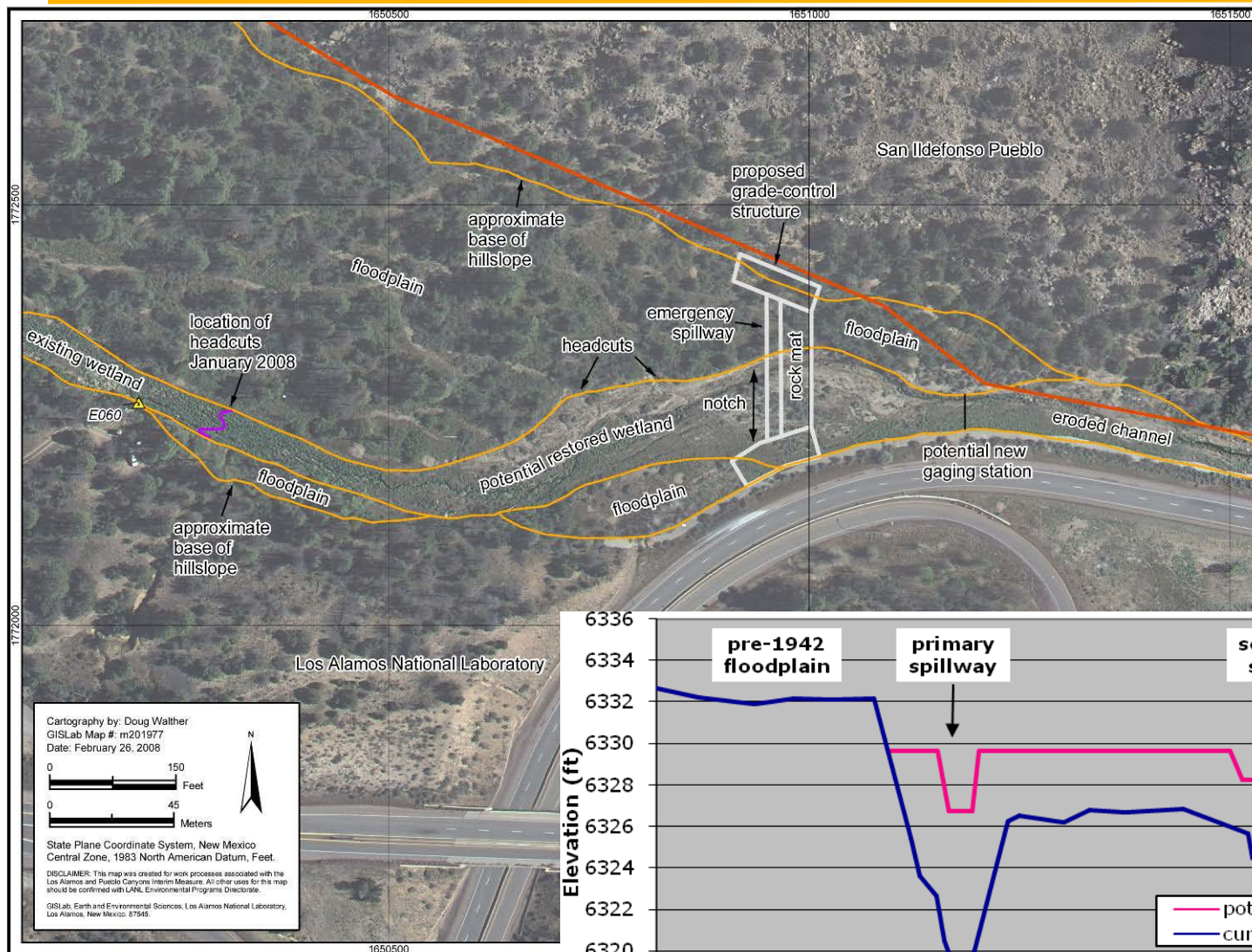
Wetland Deposition



Post-Fire Runoff

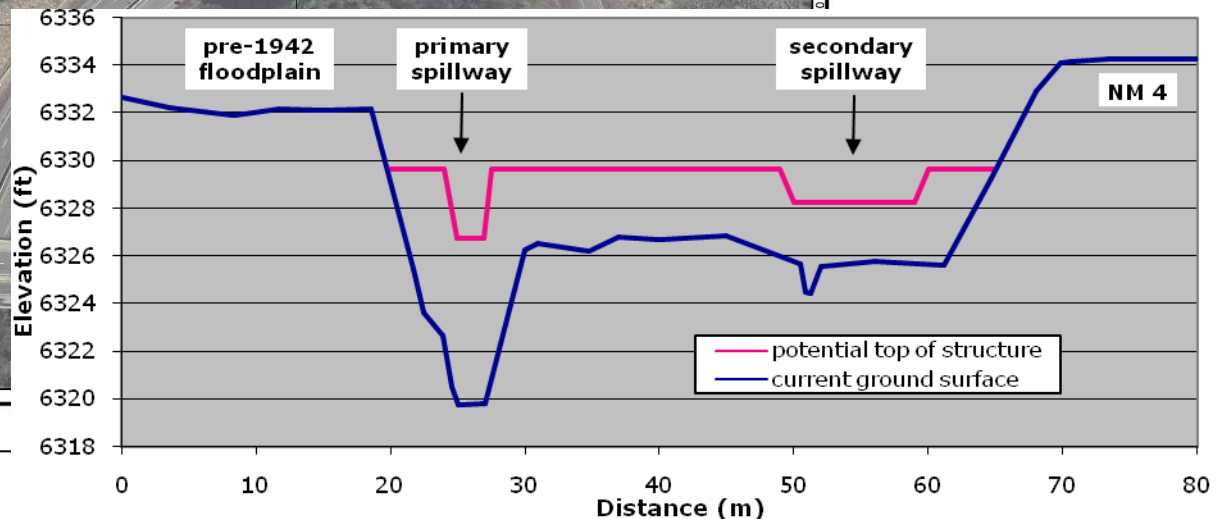


Wetland Stabilization – Grade Control



Conceptual grade-control structure

Extend and stabilize terminus of wetland



NATIONAL LABORATORY
EST. 1943

LA-UR-09-1128

Pueblo Canyon Grade Control Structure



Pueblo Canyon Grade Control Structure



Pueblo Canyon Grade Control Structure



Pueblo Canyon Grade Control Structure



Pueblo Canyon Monitoring – E060.1



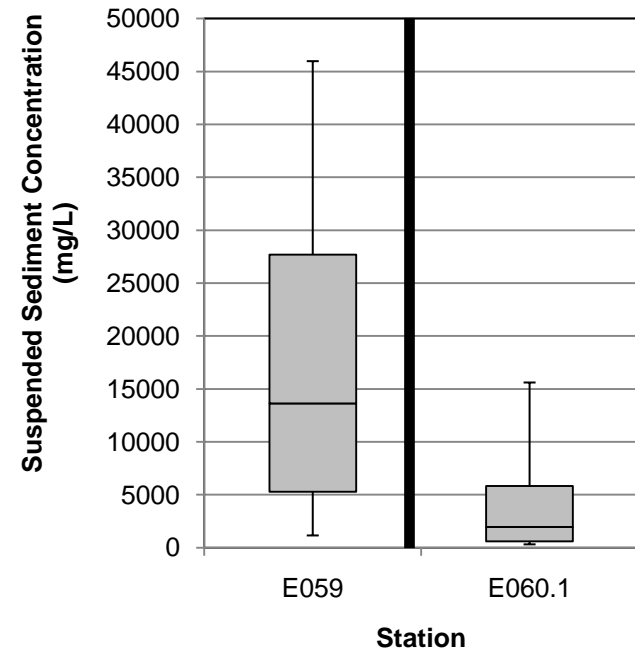
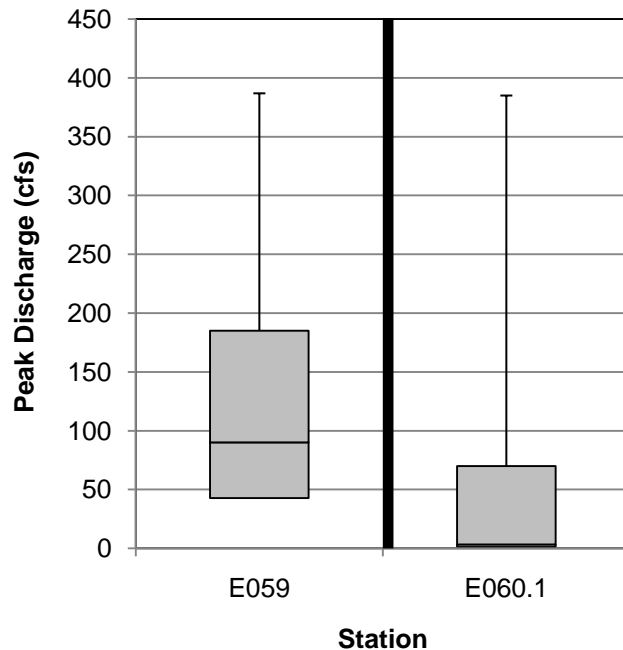
Pueblo Canyon Monitoring – E060.1



Gage E060.1



2010 Performance Monitoring Data – Lower Pueblo Canyon Wetland



DP Canyon Grade Control Structure



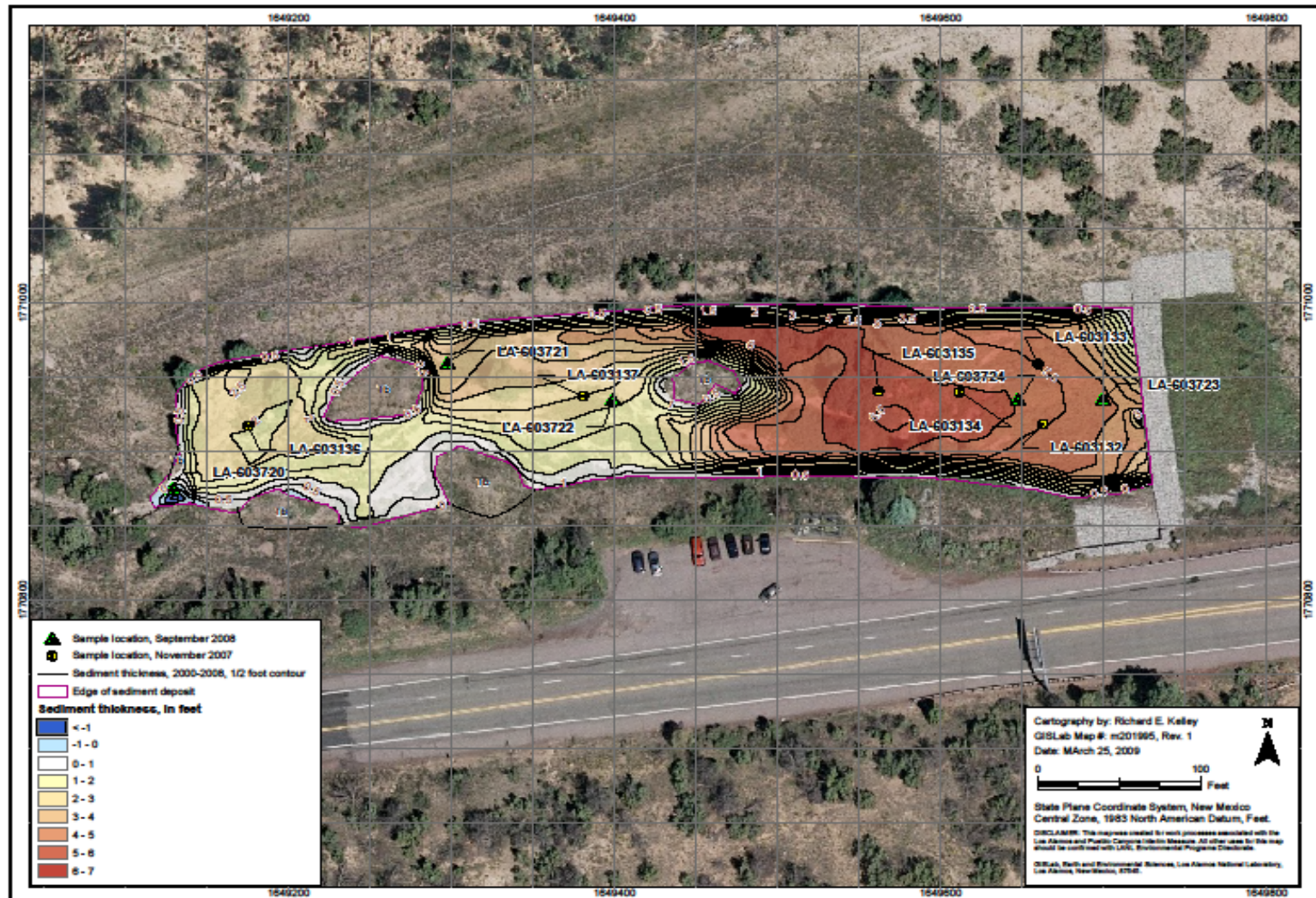
DP Canyon E039 Flume



DP Canyon Performance Monitoring

- Insert Box Plots here

LA Weir Excavation/Enhancement



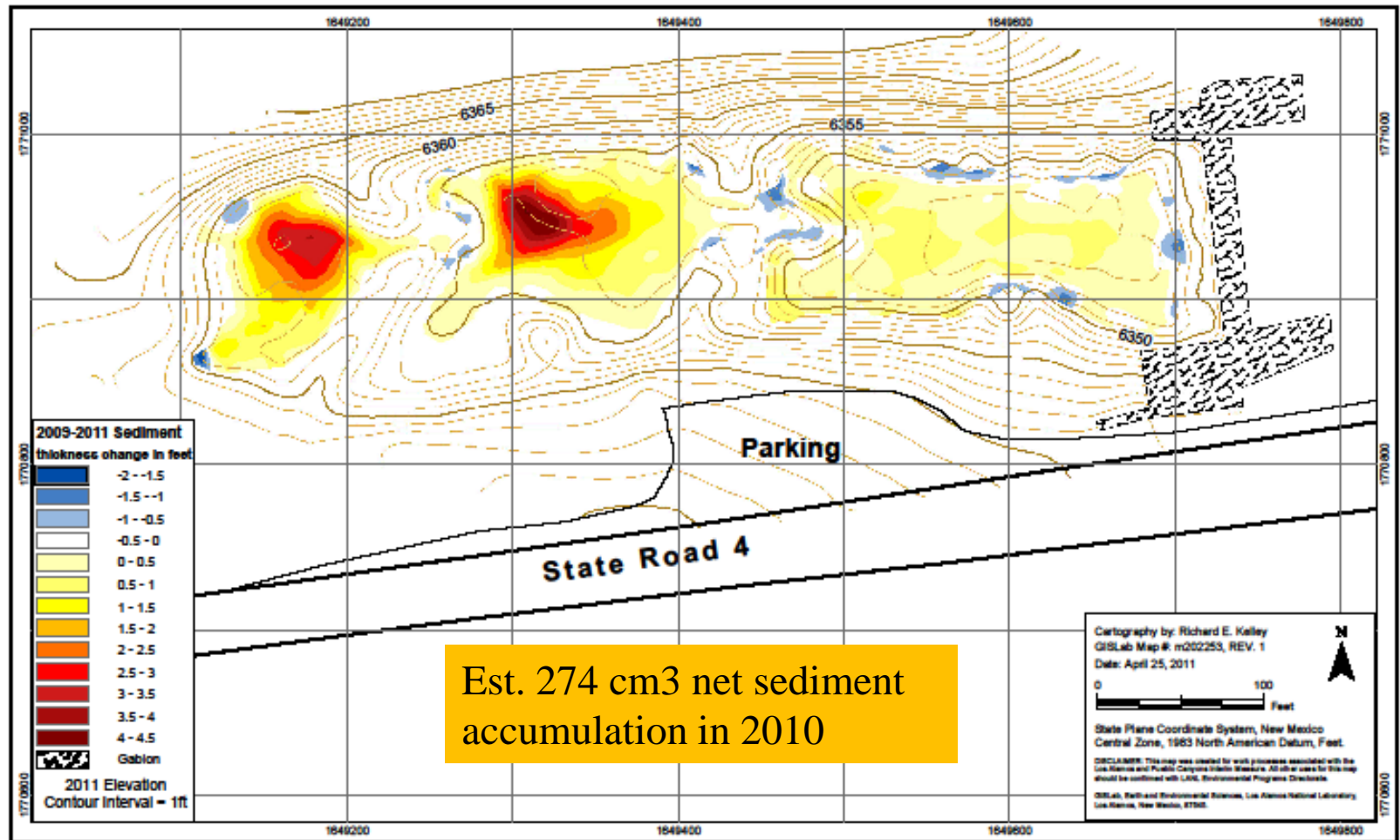
Los Alamos Canyon Weir Prior to Excavation



LA Canyon Weir After Excavation



2010 Geomorphic Survey Data



2010 LA Weir Performance

- Plots here showing sediment and flow boxes

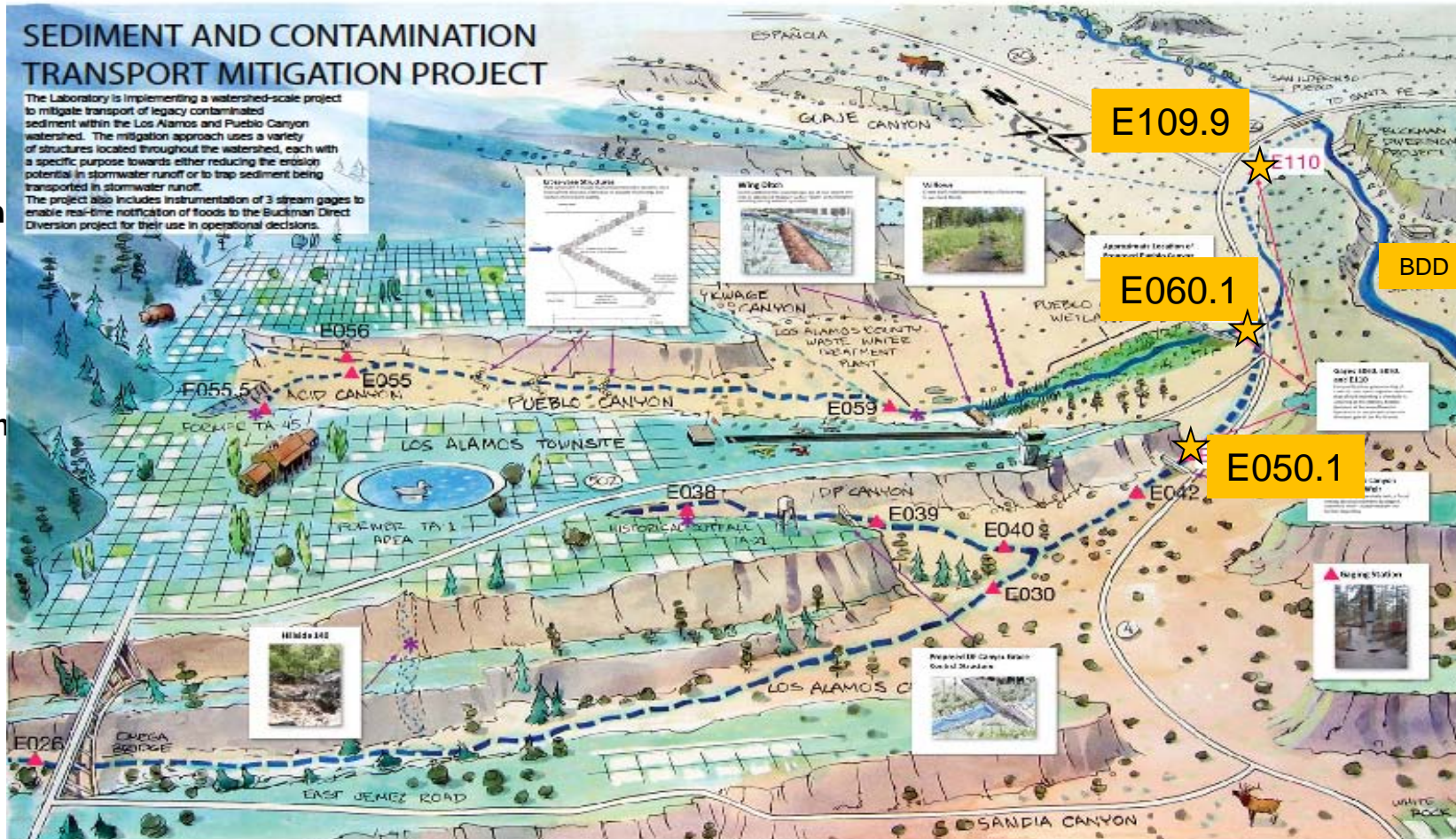
Relation of Storm Water Monitoring to Buckman

Early-Notification System

3 lower canyon gages (E050.1, E060.1 and E109.9)

Real-time communication of flow for Buckman

Water-quality data



Questions?